

Online workshops on the teaching and practice of endoscopic sinus surgery techniques during the COVID-19 pandemic*

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To the editor:

Surgical methods can be learned through shared video files, but comprehending a surgeon's intent through videos alone is difficult. By conducting workshops and explaining surgical videos, research group members have worked to educate doctors about surgical techniques for endoscopic sinus surgery (ESS). Because the COVID-19 pandemic has restricted face-to-face meetings, we switched to virtual modality. We received numerous participant responses regarding the virtual meetings which gave us scope for improvement. We therefore introduced innovations to a recent meeting. An additional file shows details of methods (Supplemental Figure 1).

We utilized real-time surveys during the lecture and asked questions focused on participant experiences regarding surgical methods. Table 1 summarises the answers to each question.

Although 21 participants were confident about intranasal antrostomy, only five physicians reported extensive canine fossa incision experience.

Following the lecture, 30 participants completed the post-survey and Table 2 summarises the post-questionnaire results. Nine had less than six years' otolaryngology experience, a slight downward trend compared to the previous study. The number of participating board-certified doctors increased. While 11 participants reported using the online meeting tool for the first time in the previous meeting, during the current workshop, 29 participants (96.7%) had experience using the tool. An equal number of participants attended the workshop from home and work (n = 14). In the first online lecture, 20 participants reported video viewing problems. This number reduced to 12 in the current lecture. Of the participants, 23 approved of the innovative

intra-lecture voting function and 22 considered the number of questions appropriate. Overall online meeting-related satisfaction was similar to the previous online lecture; 26 participants considered the elimination of travel a benefit. In the first meeting, 16 participants expressed a preference for future online studies, while 24 did so this time.

In the questionnaire results analysis based on otolaryngology experience and board certification, there were no significant differences in terms of online tool usage experience, participant location, equipment used, or impressions of the meeting (Supplemental Figure 2). Regarding video quality evaluation, 33% of the doctors with less than six years' otolaryngology experience and 40% with 6-10 years' experience reported no problems, whereas 81% with more than 10 years' experience faced a slight problem; similarly, a higher percentage of board-certified doctors identified problems in video quality. We observed a similar tendency in video comprehension (Supplemental Figure 2A). Contrastingly, 44% of the participants with less than six years' experience responded positively to the voting function. This trend was slightly lower than that of physicians with 6-10 years' (100%) and more than 10 years' experience (88%; Supplemental Figure 2B). Furthermore, physicians with less than six years' experience (67%), 6-10 years' experience (80%), and more than 10 years' experience (88%) preferred online-based future training (Supplemental Figure 3).

It has been difficult to conduct workshops while preventing the spread of COVID-19⁽¹⁾, which has encouraged a shift towards the online modality. We therefore digitised the content of our ESS-related technical workshop⁽²⁾. This online lecture had been well received, but opportunities for improvements existed. Therefore,

Table 1. Real-time questions during lectures.

1. Are you confident about opening the maxillary sinus?	Number of answers
A: I can do it perfectly	10
B: I can almost do it	11
C: I cannot do much	3
D: I cannot do it	0
2. Have you ever performed a canine fossa incision surgery?	
A: <5 times	15
B: 5–10 times	2
C: 10–15 times	2
D: >15 times	5
3. When do you open the maxillary sinus?	
A: After excision of the uncinate process	6
B: Immediately after removal of the ethmoid bulla	12
C: After opening the sphenoid sinus	4
D: After all other sinuses are opened	0
4. Have you ever performed a maxillary sinus puncture?	
A: <5 times	22
B: 5–10 times	1
C: 10–15 times	2
D: >15 times	6
5. Are you confident in performing the mucosal flap elevation of the lateral wall of the inferior nasal meatus?	
A: I can do it perfectly	5
B: I can almost do it	7
C: I cannot do much	11
D: I cannot do it	6

we conducted the current online lecture after making some improvements to its design. Compared to the first lecture, almost all of the participants had experiences of using the online conferencing tool, showing a marked increase. This may have been due to the uncontrolled spread of COVID-19 which has led to increased participation in virtual workshops. Interestingly, equal number of participants took part from home and work. While a typical conference requires a visit to its venue, online workshops eliminate the need for travel. Recently, many doctors have shortened their working hours to provide childcare, which has reduced workshop participation^(3,4). Accordingly, the possibility of home-based participation was considered extremely advantageous. Video streaming presents one major problem: video delay^(5,6). In the previous workshop, we distributed unedited videos to participants beforehand. Despite delayed video delivery, this step enabled the audience to freely review the relevant technique. Nonetheless, participants found watching the presentation and identifying parts of the video handout that described the technique in real time difficult. Therefore, this time, we did not distribute the video beforehand, instead creating an edited video. Additionally, we reduced the image quality and frame rate to facilitate smoother delivery. The audience responded favourably to this change. Further, we observed that answers pointing out video problems increased along with the relevant user's experience. This may have been because operation experience increases with years

of experience. Hence, video quality was evaluated more strictly in such cases. Previous reports showed that online lectures had problems regarding interactivity. Thus, we aimed to enhance interactivity through a voting function that identifies audience ideas and experiences in real time⁽⁷⁻⁹⁾. The questionnaire results, which were compiled and analysed smoothly, indicated high audience satisfaction. Moreover, we also found that the level of experience concerning opening the maxillary sinus through a canine fossa incision was far lower than that of ESS. This may have been caused by expanding ESS indications and decreasing canine fossa incision surgeries. Canine fossa incision is an important procedure, although it often has more sequelae than ESS. Therefore, providing doctors with a method for learning this procedure is important. Compared to the previous meeting, there was a significant increase in participants who wanted to hold the workshop online. This may have been because audience members had become accustomed to online meetings. Despite several uncertain factors, such as communication speeds, it is important to continue improving online workshops in the future.

This study's limitation was its small sample size. Moreover, the questionnaire answers varied depending on the audience's network environment. However, uniquely reporting on the audience's satisfaction levels regarding online ESS training sessions involving surgical video sharing was a major strength of this study.

Table 2. Post-survey results.

	1st lecture	2nd lecture
1. How many years of experience do you have working as an otolaryngologist?		
A: ≤5 years	13	9
B: 6–10 years	5	5
C: ≥10 years	14	16
2. Are you a board-certified otolaryngologist?		
A: Yes	19	21
B: No	13	9
3. How often have you used online meeting tools?		
A: I have experience in using them	21	29
B: This is my first time using them	11	1
4. From what location did you attend the lecture?		
A: Home	16	14
B: Office	15	14
C: Others	1	2
5. What information devices did you use?		
A: Personal computer (PC)	26	22
B: Tablet	4	3
C: Smartphone	2	5
6. How do you feel about being able to participate in the lecture without going to the site?		
A: Very good	12	17
B: Good	11	9
C: Neither	7	0
D: Bad	1	1
E: Very bad	0	3
7. How did you feel about the online video lectures?		
A: There were no problems	2	8
B: There were a few problems	10	9
C: There were intermittent problems	12	11
D: There were many problems	6	1
E: There were extensive problems	2	1
8. For previous participants: How did you find the video lecture this time compared to the last one?		
A: Very easy to understand		10
B: Easy to understand		5
C: There was no difference		5
D: Difficult to understand		3
E: Very difficult to understand		1
9. How did you feel about the adoption of the real-time questionnaire during the lecture?		
A: Very good		13
B: Good		10
C: Normal		5
D: Bad		2
E: Very bad		0
10. How did you feel about the time required to see the results of the real-time questionnaire during the lecture?		
A: Result provision was very fast		13
B: Result provision was fast		10
C: Result provision was normal		3
D: Result provision was slow		4
E: Result provision was very slow		0
11. Regarding the real-time question function during the lecture, was the number of questions appropriate?		
A: Too many		1
B: Many		5
C: Appropriate		22
D: Few		0
E: Too few		2

12. Would you like to have online sessions or face-to-face sessions in the future?

A: Online only	6	13
B: Mainly online	10	11
C: Both online and face-to-face	10	4
D: Mainly face-to-face	5	2
E: Face-to-face only	1	0

Online workshops will retain their importance during the COVID-19 pandemic because large gatherings remain infeasible. Organising study groups to increase participant satisfaction may help explore ways for physicians to improve their practice quality in such challenging environments.

Authorship contribution

MH and HI supervised the project. TT analysed the data and wrote the manuscript. YM, KT, SN, KK and TK provided advice on project planning and data interpretation. All authors participated in discussion of the results and critically reviewed and approved the final draft.

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Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

Not applicable.

Conflict of interest

The authors have no conflicts of interest to declare.

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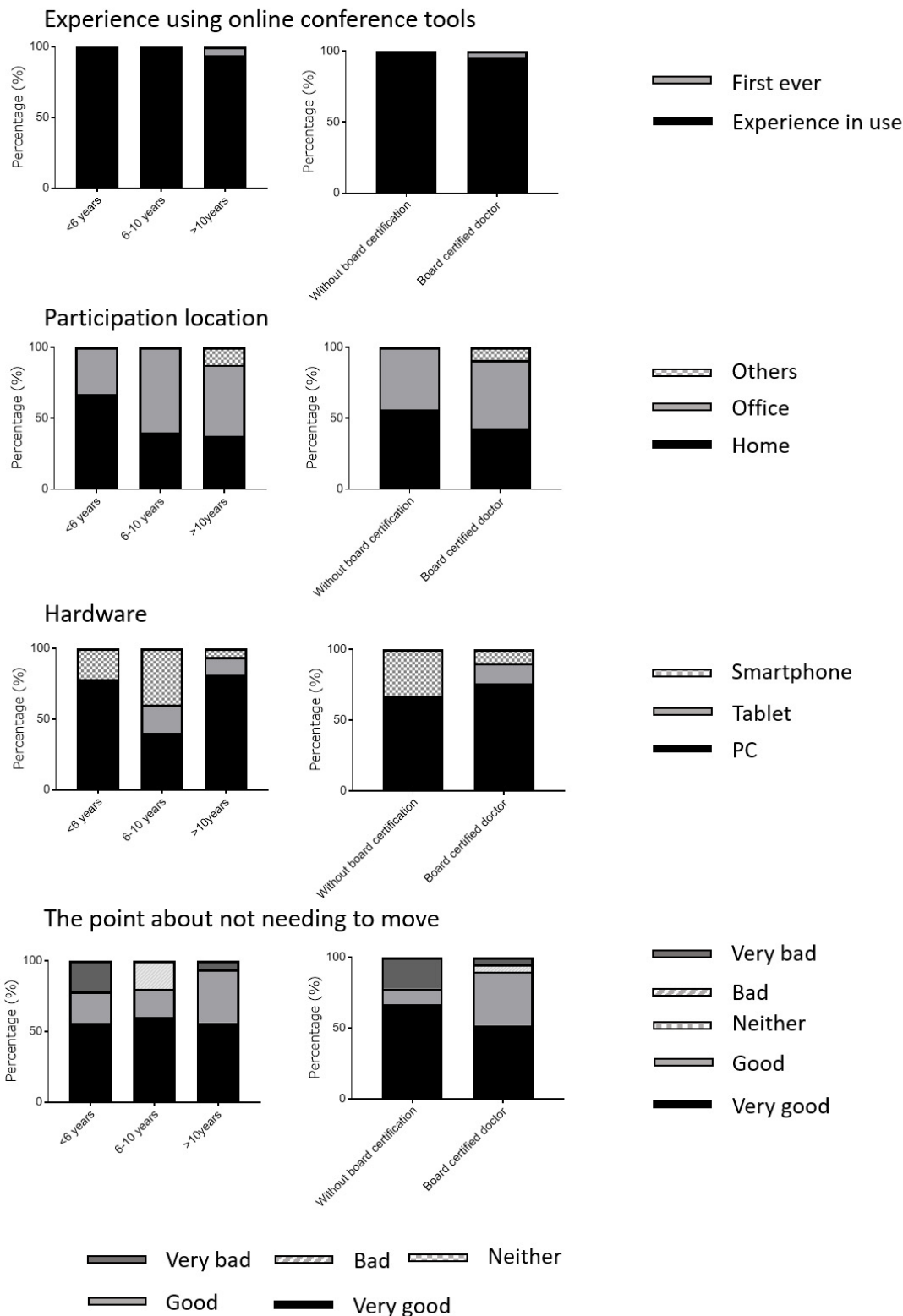
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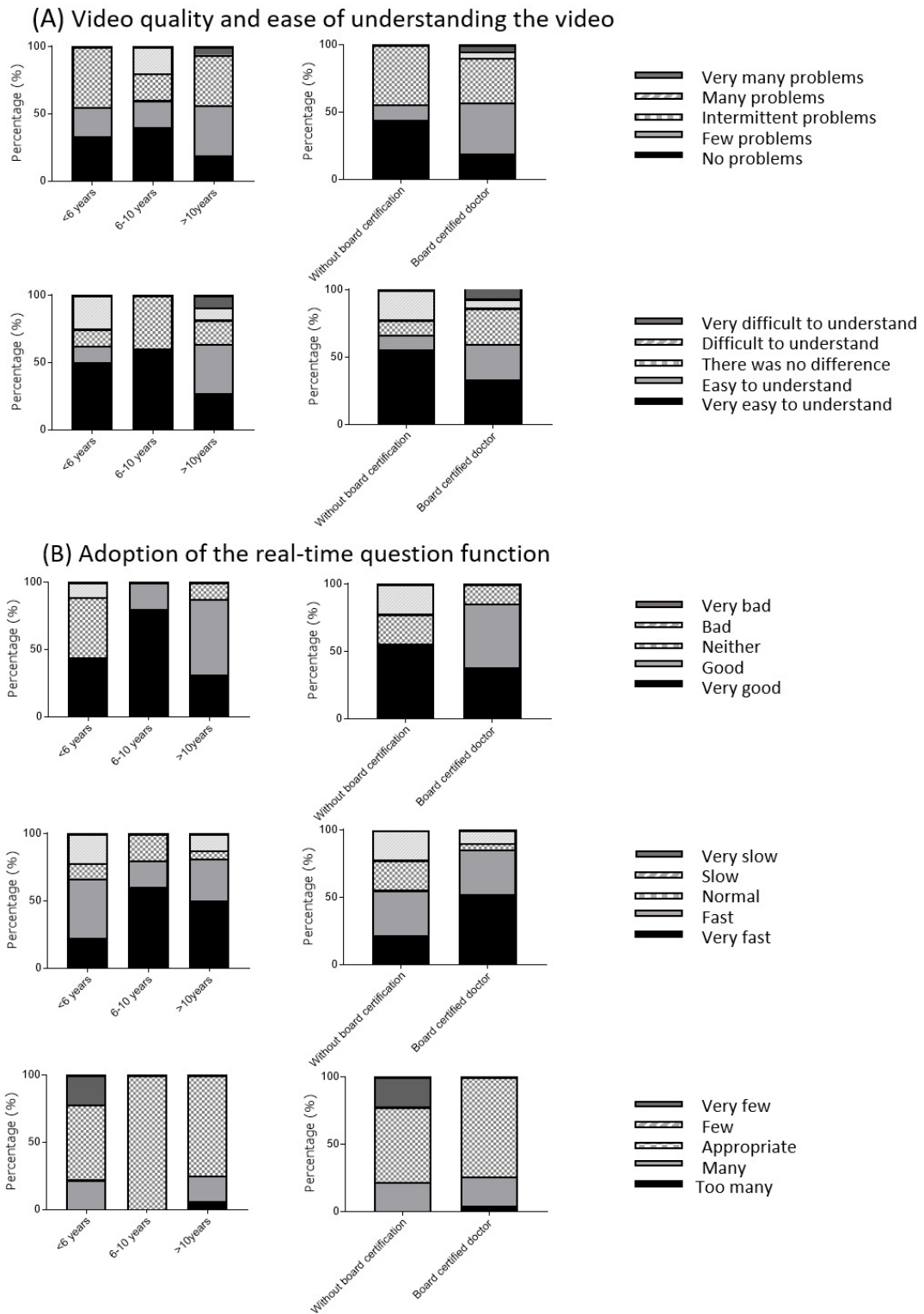
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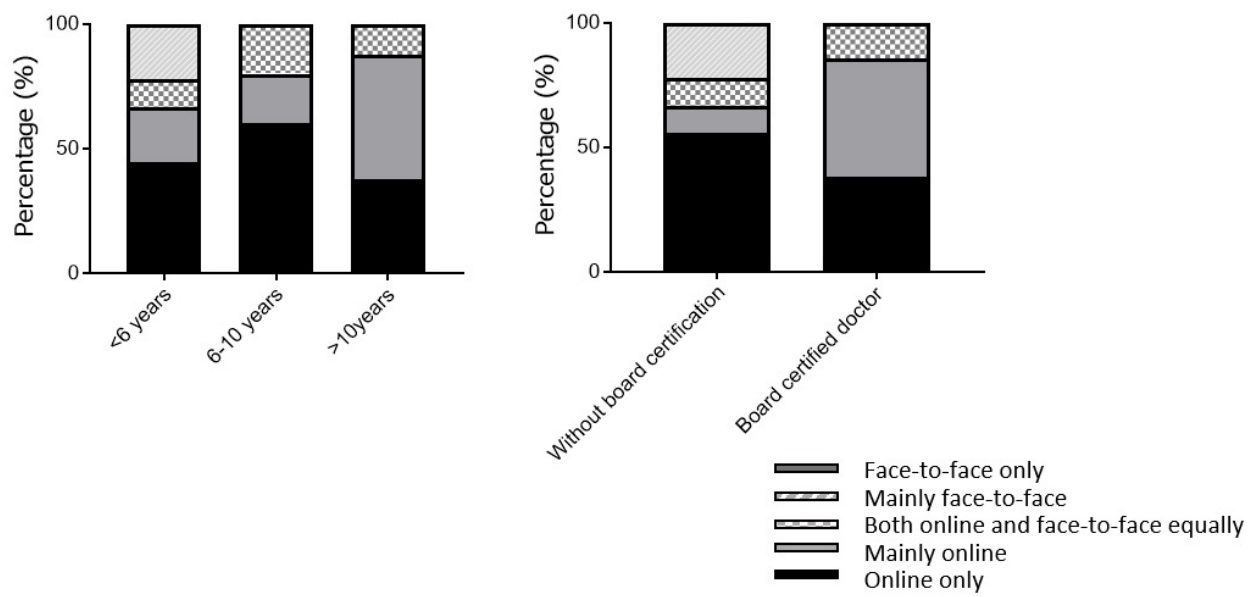
SUPPLEMENTAL DATA



Supplemental Figure 1. Post-lecture questionnaire results based on medical specialty and years of experience. No significant differences were observed in terms of experience of using online tools, location, mobile equipment, or impressions regarding the meeting depending on years of otolaryngology experience or being board certified.



Supplemental Figure 2. (A) Video quality and ease of understanding the video. The video evaluation tended to be stricter as participants' years of experience increased. Similarly, the number of answers highlighting difficulties in understanding the videos tended to increase with participants' years of experience. (B) Adoption of the real-time question function. Physicians with more years of experience tended to have more favourable views of the voting function. Most participants appreciated the short time required for tabulating results. The most common response was that the number of questions was appropriate. However, some participants considered the number too high or too low.



Supplemental Figure 3. Future forms of lectures. Almost all the participants, including those who wanted to use both online and face-to-face formats, wanted to continue holding online lectures in the future.